Table 4.3
Summary of Stormwater Discharge Dilution Modeling Results for the Trans-Lake Water Quality Study

Stormwater Alternative	Bridge Lane Alternative	Rainfall/Runoff Scenario	Average Storm Flow Rate to Containment Lagoon (cfs)[1]	Total Flow *Volume* per Storm Event (ft^3)[2]	Total Volume of Containment Lagoon (ft^3)[3]	Predicted Dilutions in Containment Lagoon during Storm Event			Dilution at the Lagoon Interface with Lake (10 ft)[5]	Dilution at Mixing Zone Boundary (100 ft)[6]
						Dilution at 25% Storm flow into Lagoon[4]	Dilution at 50% Storm flow into Lagoon[4]	Dilution at 100% Storm flow into Lagoon[4]		
I. Pontoons with Catch Basins	4	10% WQ Treatment	0.018	143.4	13,591	190	142	95	474	1895
		50% WQ Treatment	0.096	717.2	13,591	38	28	19	95	379
		WQ Treatment	0.192	1434.4	13,591	19	14	9	47	189
	6	10% WQ Treatment	0.024	226.9	26,460	233	175	117	292	1166
		50% WQ Treatment	0.136	1134.6	26,460	47	35	23	58	233
		WQ Treatment	0.272	2269.2	26,460	23	17	12	29	117
	8	10% WQ Treatment	0.028	272.0	78,300	576	432	288	360	900
		50% WQ Treatment	0.140	1359.9	78,300	115	86	58	72	180
		WQ Treatment	0.280	2719.9	78,300	58	43	29	36	90
II. Pontoons with Vault System	4	10% WQ Treatment	0.014	143.4	13,591	190	142	95	474	1895
		50% WQ Treatment	0.074	717.2	13,591	38	28	19	95	379
		WQ Treatment	0.150	1434.4	13,591	19	14	9	47	189
	6	10% WQ Treatment	0.024	226.9	26,460	233	175	117	292	1166
		50% WQ Treatment	0.118	1134.6	26,460	47	35	23	58	233
		WQ Treatment	0.238	2269.2	26,460	23	17	12	29	117
	8	10% WQ Treatment	0.028	272.0	78,300	576	432	288	360	900
		50% WQ Treatment	0.142	1359.9	78,300	115	86	58	72	180
		WQ Treatment	0.284	2719.9	78,300	58	43	29	36	90

Notes:

[1] Flow rate values calculated using Ecology's WWHM Methodology using KCRTS 2-year flow and a 15-minute time-step.

[2] Total flow volumes for each defined storm event were calculated using the SCS Method in WWHM.

[3] The minimum lagoon draft (depth) of 12 feet has been used to calculate the minimum lagoon volumes (worst-case condition). Information provided by WSDOT engineers shows that the bridge draft (depth) will range from a minimum of 12 feet in the middle of the floating bridge to 22 feet at the ends of the bridge, with an average draft of 17 feet.

[4] Dilution values represent stormwater discharge at stages in the storm event (25, 50 and 100 percent) that mix into progressive volumes in the containment lagoon (50, 75, and 100 percent), and assumes no runoff escapement.

[5] Dilution at 10 feet from the bottom edge of the containment lagoon's interface with Lake Washington. Dilution rates at this interface decrease with increasing width of the containment lagoon.

[6] Dilution at the mixing zone boundary (100 feet from the containment lagoon discharge point) results from turbulent mixing and vertical diffusion in the lake. These dilutions are plausible minimum values under dry season lake conditions.

Abbriveations:

% = percent
cfs = cubic feet per second
ft^3 = cubic feet
ft = feet
WQ = water quality
Ecology = Washington State Department of Ecology
WWHM = Western Washington Hydraulic Manual
KCRTS = King County Run-Time Series
SCS = Soil Conservation Service
WSDOT = Washington State Department of Transportation